

To our customers,

Old Company Name in Catalogs and Other Documents

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April 1st, 2010
Renesas Electronics Corporation

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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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H8S/2276 Series
Expansion I/O Board
(HS2276EIO61H) for E6000 Emulator
User's Manual

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IMPORTANT INFORMATION

READ FIRST

- **READ** this user's manual before using this emulator product.
- **KEEP the user's manual handy for future reference.**

Do not attempt to use the emulator product until you fully understand its mechanism.

Emulator Product:

Throughout this document, the term "emulator product" shall be defined as the following products produced only by Hitachi, Ltd. excluding all subsidiary products.

- E6000 series emulator station
- Expansion I/O board
- User system interface cables
- PC interface board
- SIMM Memory module

The user system or a host computer is not included in this definition.

Purpose of the Expansion I/O Board:

This expansion I/O board is installed in the E6000 emulator, and enables the emulator station to be connected to the user system interface cable. This expansion I/O board must only be used for the above purpose.

Improvement Policy:

Hitachi, Ltd. (including its subsidiaries, hereafter collectively referred to as Hitachi) pursues a policy of continuing improvement in design, functions, performance, and safety of the emulator product. Hitachi reserves the right to change, wholly or partially, the specifications, design, user's manual, and other documentation at any time without notice.

Target User of the Emulator Product:

This emulator product should only be used by those who have carefully read and thoroughly understood the information and restrictions contained in the user's manual. Do not attempt to use the emulator product until you fully understand its mechanism.

It is highly recommended that first-time users be instructed by users that are well versed in the operation of the emulator product.

LIMITED WARRANTY

Hitachi warrants its emulator products to be manufactured in accordance with published specifications and free from defects in material and/or workmanship. Hitachi, at its option, will repair or replace any emulator products returned intact to the factory, transportation charges prepaid, which Hitachi, upon inspection, determine to be defective in material and/or workmanship. The foregoing shall constitute the sole remedy for any breach of Hitachi's warranty. See the Hitachi warranty booklet for details on the warranty period. This warranty extends only to you, the original Purchaser. It is not transferable to anyone who subsequently purchases the emulator product from you. Hitachi is not liable for any claim made by a third party or made by you for a third party.

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Figures:

Some figures in this user's manual may show items different from your actual system.

Limited Anticipation of Danger:

Hitachi cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this user's manual and on the emulator product are therefore not all inclusive. Therefore, you must use the emulator product safely at your own risk.

SAFETY PAGE

READ FIRST

- **READ** this user's manual before using this emulator product.
- **KEEP the user's manual handy for future reference.**

Do not attempt to use the emulator product until you fully understand its mechanism.

DEFINITION OF SIGNAL WORDS



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.



CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

NOTE emphasizes essential information.

WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

- 1. Do not repair or remodel the emulator product by yourself for electric shock prevention and quality assurance.**
- 2. Always switch OFF the E6000 emulator and user system before connecting or disconnecting any CABLES or PARTS.**
- 3. Always before connecting any CABLES, make sure that pin 1 on both sides are correctly aligned.**
- 4. Supply power according to the power specifications and do not apply an incorrect power voltage. Use only the provided power cable.**

Preface

Thank you for purchasing this H8S/2276 series expansion I/O board (HS2276EIO61H; hereinafter referred to as the expansion I/O board) for the H8S/2214 series E6000 emulator.

The expansion I/O board enables user systems for Hitachi's original microcomputer H8S/2276 series to be developed using an H8S/2214 series E6000 emulator (HS2214EPI61H; hereinafter referred to as the emulator).

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Section 1 Overview

The H8S/2276 series E6000 expansion I/O board (hereinafter referred to as the expansion I/O board) is an efficient software and hardware development support tool for application systems using Hitachi's original microcomputer H8S/2276 series FLEX™ decoder interface.

The expansion I/O board should be used with H8S/2214 series E6000 emulator (HS2214EPI61H: hereinafter referred to as the emulator). HDI HS2214EPI61SR V1.01 or later is necessary.

Note: FLEX™ is a registered trademark of Motorola, Inc. in the United States.

1.1 Environment Conditions

Table 1.1 Environment Conditions

Item	Specifications
Temperature	Operating: +10 to +35°C
	Storage: -10 to +50°C
Humidity	Operating: 35 to 80% RH; no condensation
	Storage: 35 to 80% RH; no condensation
Ambient gases	No corrosive gases
Power supply	Power supply from E6000 emulator station
User system voltage (UVcc)	Depends on the MCU within the range 2.7 V to 3.6 V

1.2 Supported MCUs and User System Interface Cables

Table 1.2 shows the correspondence between the MCUs and the user system interface cables supported by the E6000.

Table 1.2 H8S/2276 series MCU and User System Interface Cable

No.	MCU Type Number	Package	E6000 User System Interface Cables
1	HD64F2277	TFP-100B	HS2276ECH61H
		TFP-100G	HS2276ECN61H

1.3 Operating Voltage and Frequency Specifications

Table 1.3 shows the MCU operating voltage and frequency specifications supported by the E6000. If the E6000 is used in an environment that exceeds the operating voltage range and operating frequency range guaranteed for the MCU operation, normal emulator operation is not guaranteed.

Table 1.3 Operating Voltage and Frequency Specifications

No.	MCU Type	Operating Voltage (V)	Operating Frequency (ϕ) (MHz)
1	H8S/2276 series	2.7-3.6	2-13.5

NOTE

For details on the operating voltage and frequency specifications, refer to the MCU hardware manual.

1.4 Components

Figure 1.1 shows the HS2276EIO61H expansion I/O board appearance, and table 1.4 lists the components of the expansion I/O board. Please make sure you have all of these components when unpacking.

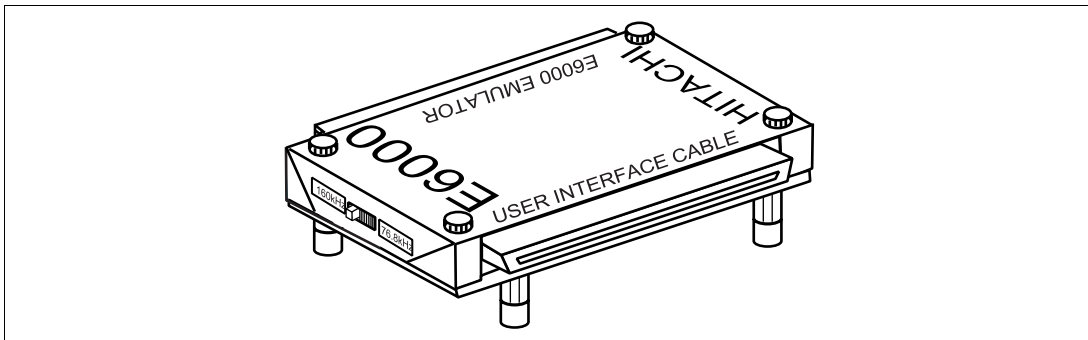


Figure 1.1 HS2276EIO61H Expansion I/O Board

Table 1.4 HS2276EIO61H Components

No.	Component	Quantity	Remarks
1	HS2276EIO61H	1	Expansion I/O board
2	Documentation	1	User's manual for HS2276EIO61H (this manual)

Section 2 Connection Procedures

WARNING

Always switch OFF the user system and the emulator product before the EXPANSION I/O BOARD or USER SYSTEM INTERFACE CABLE is connected to or removed from any part. Before connecting, make sure that pin 1 on each side is correctly aligned. Failure to do so will result in a FIRE HAZARD and will damage the user system, the emulator product, the user system interface cable, and the expansion board, or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

2.1 Using Emulator without Connecting User System

1. Make sure the emulator is turned off.
2. After making sure the direction of the expansion I/O board connector labeled E6000 EMULATOR is correct, firmly insert the expansion I/O board connector into the emulator station connector labeled USER INTERFACE. When the emulator is operated while connected to only the expansion I/O board (without connecting the user system), disconnect the cable body from the expansion I/O board.

2.2 Using Emulator with Connecting User System through User System Interface Cable

CAUTION

When connecting or removing the user system interface cable, apply force only in the direction suitable for connection or removal, while making sure not to bend or twist the cable or connectors.

Otherwise, the cables or connectors will be damaged.

1. Make sure the emulator and the user system are turned off.
2. [1] After making sure the direction of the expansion I/O board connector labeled E6000 EMULATOR is correct, firmly insert the expansion I/O board connector into the emulator station connector labeled USER INTERFACE ([1] in figure 2.1).
[2] To connect the expansion I/O board labeled USER INTERFACE CABLE and the user system interface cable body.

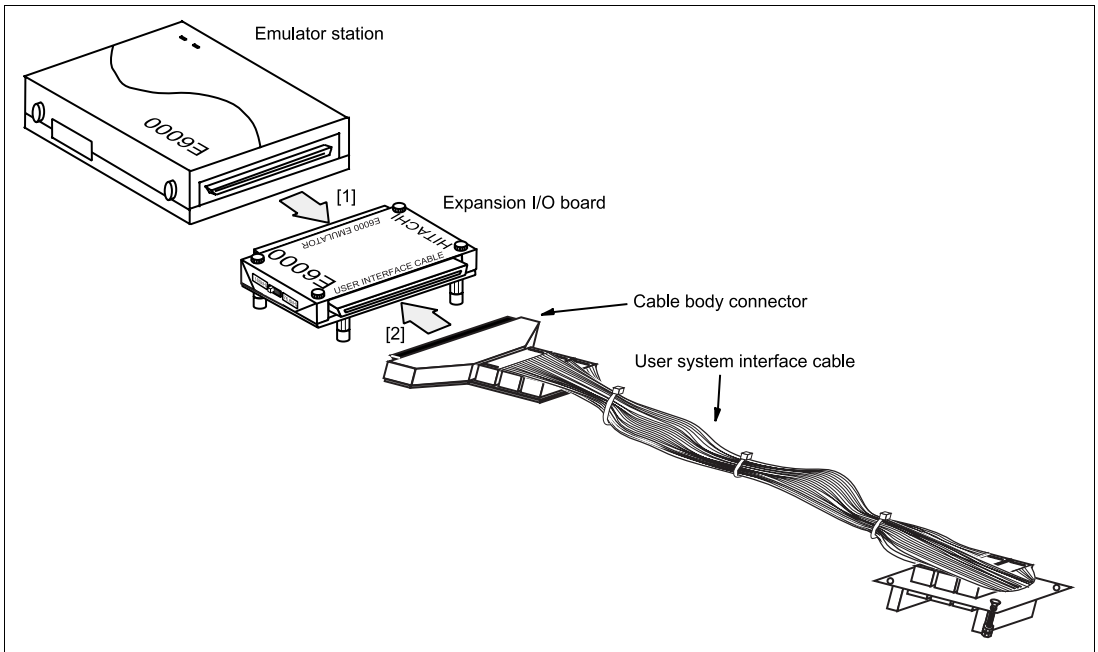


Figure 2.1 Connecting Expansion I/O Board to Emulator Station and User System Interface Cable

Section 3 Interface

Protection circuits, are provided for the H8S/2276 series FLEX™ decoder interface of the expansion I/O board. Signals are connected to the user system interface cable with the protection circuit. Figure 3.1 shows the FLEX™ decoder interface signals which are S7 to S0, LOBAT, EXTS1 to 0, SYMCLK, and CLKOUT.

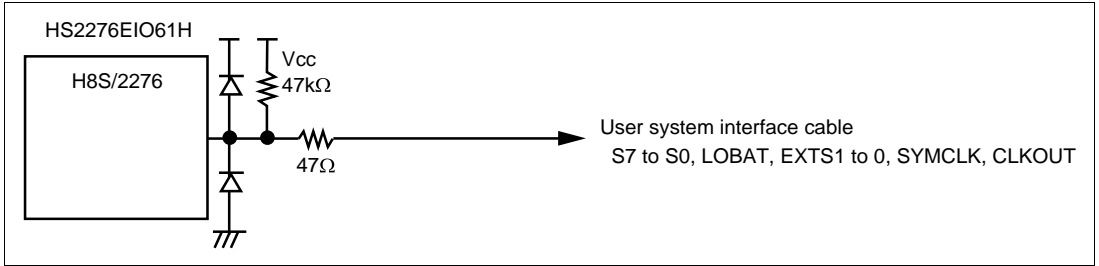


Figure 3.1 FLEX™ decoder Interface Signals

Section 4 Setting Operating Clock

4.1 Subclock (OSC2, 1)

When the switch is set on the expansion I/O board (Subclock selection) and jumper P4 is set on the user system interface cable, subclocks in table 4.1 can be selected. Select Target in the Configuration window. (Figure 4.1, Figure 4.2)

Table 4.1 Setting Subclock

Expansion I/O Board (Subclock selection)	User System Interface Cable (P4)	Subclock (\varnothing_{SUB})
160 kHz	1-2 connected	160 kHz
76.8 kHz		76.8 kHz
The setting of the subclock selection switch can be either 160 kHz or 76.8 kHz.	2-3 connected	Target subclock

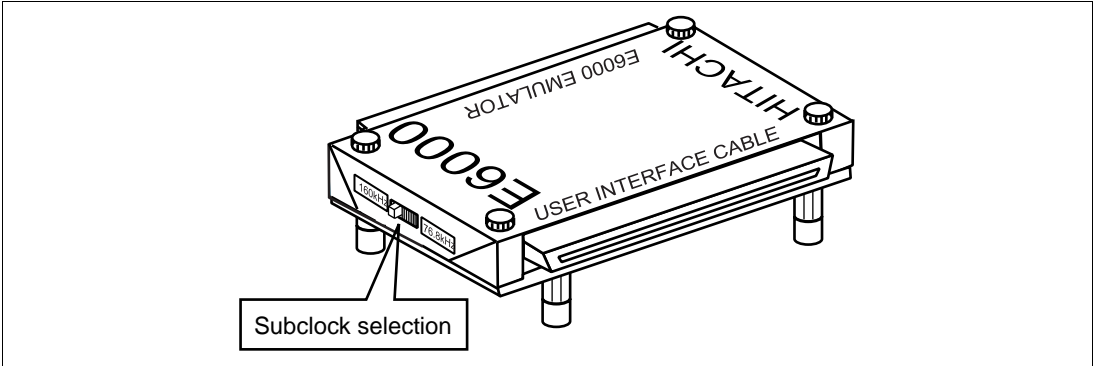


Figure 4.1 Subclock Selection for HS2276EIO61H Expansion I/O Board

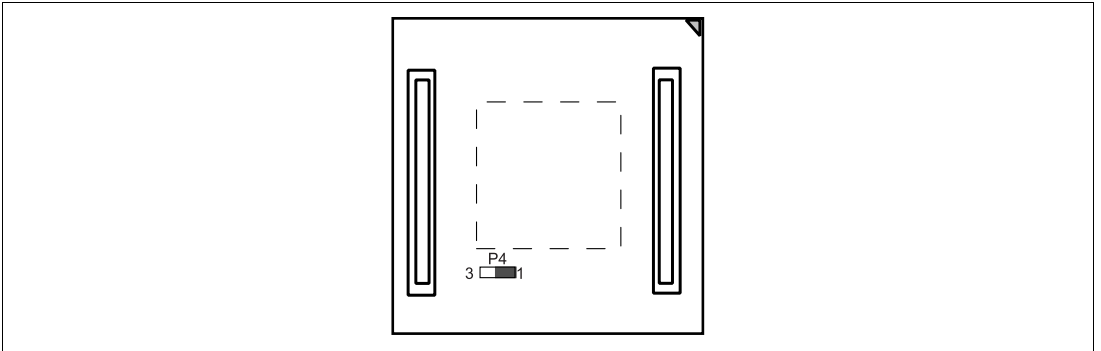


Figure 4.2 User Cable Connector (P4)

Section 5 Notice

WARNING

Observe the precautions listed below. Failure to do so will result in a FIRE HAZARD and will damage the user system and the emulator product or will result in PERSONAL INJURY. The USER PROGRAM will be LOST.

- 1. This expansion I/O board is specifically designed for the HS2214EPI60H. Do not use this expansion I/O board with any other emulator station.**
- 2. Use the H8S/2276 series user system interface cable (HS2276ECH61H or HS2276ECN61H). Do not use any other series of user system interface cable.**

1. Do not place heavy objects on the expansion I/O board.
2. Power is supplied from the emulator station to the expansion I/O board.